

## Attachment 1

### Request for Additional Information (Public)

#### AREVA Enrichment Services LLC Eagle Rock Enrichment Facility (EREF) License Application Docket: 70-7015

**DRAFT** August 4, 2009

### **General Information (Chapter 1)**

#### **GI-1 Table 1.2-1**

Table 1.2-1 provides information on the types of materials proposed for use. The applicant should provide total quantities of licensed materials to be possessed, including any calibration sources proposed to be used and proposed possession limits.

Regulations in 10 CFR 70.22(a)4 require an applicant to identify the name, amount, and specification of the material proposed for use.

### **Financial Qualifications (Chapter 1, Section 1.2.2, Financial Information)**

#### **FQ-1 Section 1.2.2**

Provide the proposed financial plan for the construction and operation of EREF (i.e., the proposed percentages of debt and equity to be used in the financing of the project, a brief statement on any long-term contracts in place or under negotiation, a brief statement on which entity is considered the parent company with respect to financial qualifications).

The license application (in Section 1.2.2) states:

There are financial qualifications to be met before a license can be issued. AES acknowledges the use of the following Commission-approved criteria as described in Policy Issues Associated with the Licensing of a Uranium Facility; Issue 3, Financial Qualifications (LES, 2002) in determining if the project is financially feasible:

Construction of the facility shall not commence before funding is fully committed. Of this full funding (equity and debt), the applicant must have in place before constructing the associated capacity: (a) a minimum of equity contributions of 30% of project costs from the parents and (b) firm commitments ensuring funds for the remaining project costs.

AES shall not proceed with the project unless it has in place long-term enrichment contracts (i.e., five years) with prices sufficient to cover both construction and operation costs, including a return on investment for the entire term of the contracts.

The application, however, does not provide the supporting basis for the staff to determine if the financial qualifications can be met.

10 CFR 70.22(a)(8) requires financial qualifications of the applicant "Where the nature of the proposed activities is such as to require consideration of the applicant's financial qualifications to engage in the proposed activities in accordance with the regulations in this chapter...."

#### **Radiation Protection (Chapter 4)**

##### **RP-1 Sections 4.5 and 4.51**

Clarify the frequency of training program evaluation and review/updates. There appears to be inconsistency in the frequency of evaluation/review/update of the Radiation Protection training program. The last two sentences of the next to last paragraph of Section 4.5 state an annual frequency while Paragraph 7 of Section 4.5.1 and Paragraph D of Section 11.3.3.1.1 state a frequency of 2 years.

##### **RP-2 Sections 4.6.1**

Clarify in Section 4.6.1, of the Safety Analysis Report (SAR), whether exhaust ventilation serving potentially contaminated areas of dispersible materials are treated for radiological and hydrogen fluoride (HF) contamination in the air stream via filters, similar to the Gaseous Effluent Ventilation Systems (GEVSS), and whether these filters (pre-, high efficiency particulate air (HEPA), and carbon adsorption) are continuously monitored for differential pressure and that the air stream is monitored for alpha and HF concentrations. This is needed so that staff can determine compliance with 10 CFR 20.1701, 70.23(a)(3), and NUREG-1520 Section 4.4.6.3(4) which require adequate process and engineering controls affecting the concentration of radioactive materials in air.

##### **RP-3**

Explain the effluent sampler mechanism for the Liquid Effluent Collection and Treatment System and summarize this equipment's operating history. This is needed for staff to determine compliance with 10 CFR 20.1501(a)(2), 70.23(a)(3), and NUREG-1520, Section 4.4.7.3(11) which require adequate equipment and facilities to quantify radiological hazards.

##### **RP-4 Section 4.4**

Section 4.4, final paragraph, of the SAR does not discuss distribution of Radiation Protection procedures in accordance with NUREG-1520, Section 4.4.4.3(2). This is needed for staff to determine compliance with 10 CFR 70.22(a)(8) which requires adequate procedures.

##### **RP-5 Section 4.8.1.2**

Clarify in the SAR, Section 4.8.1.2, what equipment will be used for airborne activity monitoring and, if there are alarm functions, what criteria will be used to establish alarm settings. In Section 4.8.1.2, it is unclear whether the applicant is referring to continuous air monitors (which typically provide real time analysis of airborne radioactivity with alarm

capability), continuous air samplers (where filters are analyzed after being exchanged), or both. This may be indicative of some slight inconsistency with text in SAR Section 4.7, paragraphs 7 and 8. This is needed for staff to determine compliance with 10 CFR 20.1502(b), 70.23(a)(3), and NUREG-1520 Section 4.4.7.3(4) which require adequate equipment to monitor the occupation intake of radioactive material.

RP-6 Section 4.11.2

Section 4.11.2 of the SAR does not include reference to reporting requirements in 10 CFR 30.50 and 10 CFR 40.60, as applicable. Please revise the SAR or provide additional justification as to why this information is not needed. This is needed to confirm compliance with these reporting requirements which may differ slightly and be subject to change from those in 10 CFR 20 and 10 CFR 70.

RP-7 Section 4.1.1

Section 4.1.1 of the SAR does not discuss any professional staff, supervision, and/or technicians considered to be key personnel for the Radiation Protection program with defined qualifications and responsibilities. Please revise the SAR or provide additional justification as to how 10 CFR 70.22(a) is met. This is needed for staff to determine compliance with 10 CFR 70.22(a) and NUREG-1520 Section 4.4.1.3(2) and 4.4.1.3(3) which require the licensee to specify the qualifications and responsibilities of key program personnel.

RP-8 Sections 4.2.1

Section 4.2.1 of the SAR (or other section if appropriate) does not appear to consider guidance in Regulatory Guide 4.21 when performing facility construction or modifications. Please provide additional information or an alternate approach to Regulatory Guide 4.21. This is needed for staff to determine compliance with 10 CFR 20.1406 and 70.23(a)(3).

RP-9 Sections 4.6.1

Revise Section 4.6.1 of the SAR to include discussion that ventilation and containment systems will be designed and sized appropriately to reduce airborne concentrations below the applicable DAC values as described in NUREG-1520 Section 4.4.6.3(1). This is needed for staff to determine compliance with 10 CFR 20.1101(b) and 70.23(a)(3) which require adequate facilities to keep public exposures ALARA and protect health and the environment.

**Nuclear Criticality Safety (Chapter 5)**

NCS-1 Section 5.2.1.5

Identify which acceptance criteria in NUREG-1520, Section 5.4.3.4 will be used to analyze nuclear criticality safety (NCS) accident sequences in operations and processes.

SAR Section 5.2.1.5 states:

NCS analyses also meet the following: The NCS methodologies and technical practices in NUREG-1520 (NRC, 2002), Section 5.4.3.4, are used to analyze NCS accident sequences in operations and processes.

Not all the criteria in NUREG-1520, Section 5.4.3.4 appear to be applicable to NCS analyses. This information is needed to clarify a commitment made in the SAR.

#### NCS-2 Section 5.1.2

Justify the use of partial reflection (2.5 cm of water) to account for humans and other spurious reflectors. Clarify what is meant by “2.5 cm of water reflection around vessels.”

The SAR states:

(Section 5.1.2) Partial reflection of 2.5 cm (0.984 in) of water is assumed where limited moderating materials (including humans) may be present.

(Section 5.2.1.3.1) . . . where appropriate, spurious reflection due to walls, fixtures, personnel, etc. has been accounted for by assuming 2.5 cm (0.984 in) of water reflection around vessels.

It is not clear how partial reflection will be used in NCS analyses and that it is sufficient to account for humans or other reflectors in close proximity to SNM. 10 CFR 70.61(d) requires all nuclear processes to be subcritical under normal and credible abnormal conditions with an approved margin of subcriticality for safety.

#### NCS-3 Table 5.1-2

Clarify the safety criteria for tanks listed in Table 5.1-2 to ensure consistency with other statements in the SAR.

For example, SAR Section 5.1.2 states:

. . . the values in Table 5.1-2, Safety Criteria for Buildings/Systems/ Components, represent the limits based on 6.0 wt% enrichment except for the Contingency Dump System traps which are limited to 1.5 wt% <sup>235</sup>U.

The safety criteria for tanks listed in Table 5.1-2 is based on 5 wt% enrichment not 6 wt% enrichment. If the safety criteria for tanks will be based upon 5 wt% enrichment, justify that this is sufficiently conservative to ensure that all processes will remain subcritical. 10 CFR 70.61(d) requires all nuclear processes to be subcritical under normal and credible abnormal conditions with an approved margin of subcriticality for safety.

#### NCS-4 Section 5.2.1.3

Clarify whether or not the assumptions (other than enrichment) described in SAR Section 5.2.1.3 are used for determining the safe values of geometry or volume.

The SAR states:

(Section 5.1.2) The safe values of geometry / volume define the characteristic dimension of importance for a single unit such that nuclear criticality safety is not dependent on any other parameter assuming 6 wt% <sup>235</sup>U for safety margin.

(Section 5.1.2) The values on Table 5.1-1 are chosen to be critically safe when optimum light water moderation exists and reflection is considered within isolated systems.

(Section 5.2.1.3) The NCS analyses results provide values of k-effective ( $k_{\text{eff}}$ ) to

conservatively meet the upper safety limit. The following sections provide a description of the major assumptions used in the NCS analyses.

The assumptions described in Section 5.2.1.3 do not appear to be entirely consistent with the statements in Section 5.1.2. For example, performing analysis with an H/U ratio up to 7 may not account for optimum moderation in all cases.

10 CFR 70.61(d) requires all nuclear processes to be subcritical under normal and credible abnormal conditions with an approved margin of subcriticality for safety.

### NCS-5 Section 5.3

Revise the SAR to clarify the commitment to provide criticality accident alarm system (CAAS) coverage.

SAR Section 5.3 states:

Areas where Special Nuclear Material (SNM) is handled, used, or stored in amounts at or above the 10 CFR 70.24 (CFR, 2008d) mass limits are provided with CAAS coverage.

This statement is not consistent with the regulatory requirements of 10 CFR 70.24. 10 CFR 70.24 requires that licensees authorized to possess greater than a critical mass of SNM shall provide CAAS coverage in *each* area where SNM is handled, used, or stored. The license application requests authorization to possess greater than a critical mass of SNM, therefore an exemption to 10 CFR 70.24 must be requested to exclude areas from CAAS coverage where SNM is handled, used, or stored. Such a request should specify the areas where CAAS coverage may not be provided and justify that the 10 CFR 70.17 requirements for granting an exemption are met.

### NCS-6

Revise the Emergency Plan to clearly identify the discussion of the CAAS. The Emergency Plan (Section 2.1.1.2) states:

Refer to Section 6.4.1 for a description of the Criticality Accident Alarm System (CAAS).

Section 6.4.1 of the Emergency Plan does not describe the CAAS. This appears to be a typographic error.

### NCS-7

Describe AES's commitment to the following statements from Section 3.1.5 of the ISA Summary, and incorporate into the SAR:

- a. The CAAS will be uniform throughout the facility for the type of radiation detected, the mode of detection, the alarm signal, and the system dependability.
- b. The CAAS is . . . designed to remain operational during credible events or conditions, including fire, explosion, corrosive atmosphere, or seismic shock (equivalent to the site-specific design-basis earthquake or the equivalent value specified by the uniform building code).
- c. Whenever the CAAS is not functional, compensatory measures, such as limiting access and restricting SNM movement, will be implemented. Should the CAAS

coverage be lost and not restored within a specified number of hours, the operations will be rendered safe (by shutdown and quarantine) if necessary. Onsite guidance is provided and is based on process-specific considerations that consider applicable risk trade-off of the duration of reliance on compensatory measures versus the risk associated with process upset in shutdown.

10 CFR 70.24 requires a CAAS be maintained in each area where SNM is handled, used, or stored for facilities authorized to possess greater than a critical mass of SNM.

NUREG-1520, Section 5.4.3.4.3 indicates that commitments similar to those statements listed above are needed to ensure a CAAS is in place that will adequately meet the requirements of 10 CFR 70.24.

#### NCS-8

State in the SAR that documentation will be maintained that demonstrates the CAAS meets the requirements of 10 CFR 70.24.

10 CFR 70.24 requires a CAAS be maintained in each area where SNM is handled, used, or stored for facilities authorized to possess greater than a critical mass of SNM.

This information is needed to ensure a CAAS is in place that will adequately meet the requirements of 10 CFR 70.24.

#### NCS-9

Commit to only use NCS controls which are capable of preventing a criticality accident, or provide and justify an alternative commitment. The SAR does not clearly state that to meet the performance requirements AREVA will only use NCS controls which can prevent a criticality accident.

10 CFR 70.61(d) requires the use of preventive controls and measures as the primary means of protecting against a nuclear criticality accident.

#### NCS-10

The definition of a non-interacting unit does not appear to be practical. Explain how it is determined if a unit is non-interacting when an NCS analysis (NCSA) is not performed.

SAR Section 5.1.2 states:

A non-interacting unit is defined as a unit that is spaced an approved distance from other units such that the multiplication of the subject unit is not increased. If a unit is considered interacting, NCSAs are performed.

This definition is not practical since all units can impact the multiplication factor no matter how far apart the units are. It is unclear how a unit could be considered non-interacting if no NCSA has been performed.

10 CFR 70.61(d) requires all nuclear processes to be subcritical under normal and credible abnormal conditions with an approved margin of subcriticality for safety.

## **Fire Safety (Chapter 7)**

### **FS-1 Section 7.1.4, p. 7.1-2**

Provide detailed information on the frequency, scope, and data collected during inspections of water based fire protection systems. A referenced commitment to National Fire Protection Association (NFPA) 25, "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems," would be sufficient.

The regulation 10 CFR 70.22(a)(8) requires the applicant to provide proposed procedures to protect health and minimize danger to life and property.

The discussion of facility design in Section 7 on fire safety does not discuss a commitment to an industry standard on the inspection of fire protection systems. Section 7.3 of NUREG 1520 states that an applicant should provide commitments pertaining to fire safety management, including inspection, testing, and maintenance.

### **FS-2 Section 7.3.1, pp. 7.3-1 through 7.3-2**

Describe the types of fireproofing intended to be used on the various structural members. Describe the measures that will be employed to confirm the proper application of fireproofing during construction and that the application remains intact over the life of the building.

The regulation 10 CFR 70.22(a)(7) requires the applicant to provide a description of equipment and facilities which will be used by the applicant to protect health and minimize danger to life or property.

In accordance with the International Building Code, Type 1B construction requires that various structural elements have specific fire resistance ratings. This rating may be obtained through various means (constructed coverings, spray applied coatings, etc). The discussion of building construction in Section 7 on fire safety does not discuss how the engineering calculations used to design the fire resistance are field verified, nor does it discuss how those structural elements protected are inspected over the life of the building to verify that the required rating is the maintained.

### **FS-3 Section 7.4, p. 7.4-1**

Section 7.4 states that a combustible silicone oil-based heat transfer media is used by the UF6 cold traps. Provide the combustion characteristics of this oil (flash point, fire point, heat of combustion, etc). In addition, confirm that all lubricating oil is self-contained in the various pumps, fans, centrifuge drives, etc (i.e., no lube oil systems).

The regulation 10 CFR 70.22(a)(7) requires the applicant to provide a description of equipment and facilities which will be used by the applicant to protect health and minimize danger to life or property. In addition, the regulation 10 CFR 70.62(c)(1)(iii) requires that the integrated safety analysis identifies facility hazards that could effect the safety of licensed materials and thus present an increased radiological risk. Additionally, 10 CFR 70.65(b)(3) requires a description of each process analyzed in the ISA in sufficient detail to understand the theory of operation.

FS-4 Section 7.5.1, pp. 7.5-1 to 7.5-5

Provide information on the type of tanks used for fire protection water supply. What material is the tank constructed out of? Does the design include any seismic considerations?

The regulation 10 CFR 70.22(a)(7) requires the applicant to provide a description of equipment and facilities that will be used by the applicant to protect health and minimize danger to life or property.

NFPA 22, "Standard for Water Tanks for Private Fire Protection," provides general guidance for various tanks constructed of various materials. Not all tanks are required by NFPA 22 to have seismic loading factored into their design, therefore a commitment to NFPA 22 does not adequately explain the design of the water supply system. Section 7.3 of NUREG 1520 states that an applicant should provide commitments pertaining to fire protection systems, including water supplies.

FS-5 Section 7.5.1, pp. 7.5-1 to 7.5-5

Provide clarification on the occupant notification provided by the fire alarm system. Are both audible and visual notification provided to all occupants? How are hearing impaired individuals notified? Are there any areas of potentially high ambient noise levels that may require alternate notification techniques? Are all portions of the fire alarm system designed and installed in accordance with NFPA 72, "National Fire Alarm Code?"

The regulation 10 CFR 70.22(a)(7) requires the applicant to provide a description of equipment and facilities that will be used by the applicant to protect health and minimize danger to life or property. Additionally, 10 CFR 70.64(b)(1) requires the design to be based on defense-in-depth practices.

Section 7.5.1.7 of the submittal, only states that the fire alarm control panel is installed in accordance with NFPA 72. More detail is needed on the fire alarm system design to determine its robustness as a defense-in-depth measure.

FS-6 Section 7.5.2, pp. 7.5-5 to 7.5-7

Provide a more detailed description of the number of people trained to participate on the facility fire brigade. Is there a minimum number of trained personnel available for any given shift?

The regulation 10 CFR 70.22(a)(7) requires the applicant to provide a description of equipment and facilities that will be used by the applicant to protect health and minimize danger to life or property. In addition, 10 CFR 70.22(a)(8) requires the applicant to provide proposed procedures to protect health and minimize danger to life and property.

## FS-7 Figure 7.5-2

Provide a detailed diagram for each building showing sprinkler system coverage.

The regulation 10 CFR 70.22(a)(7) requires the applicant to provide a description of equipment and facilities that will be used by the applicant to protect health and minimize danger to life or property. Additionally, 10 CFR 70.64(b)(1) requires the design to be based on defense-in-depth practices.

It is noted in the referenced figure that certain buildings require evaluation for moderator control and may have limited or no sprinkler coverage in select areas. Details of that evaluation and a more precise description of sprinkler system coverage are needed to determine the system's robustness as a defense-in-depth measure.

## **Decommissioning (Chapter 10)**

### D-1 Section 10.1.6

Section 10.1.6 states that decommissioning will take about 8 years. 10 CFR 70.38(h) requires that decommissioning be completed no later than 24 months following the initiation of decommissioning. 10 CFR 70.38(i) allows the Commission to approve a request for an alternate schedule for completion of decommissioning if the alternative is warranted by consideration of 5 factors specified in 70.38(i)(1)-(i)(5). Request an alternate schedule for decommissioning and provide justification for the longer schedule.

### D-2 Section 10.1.6.9

Revise the initial radiation survey performed prior to initial operation such that it is adequate to establish background for use as a reference area for the final survey at decommissioning time or provide other explanation. NUREG-1757, Consolidated Decommissioning Guidance, Volume 2 Characterization, Survey, and Determination of Radiological Criteria (Revision 1), contains guidance for performing a background survey. The 10 samples discussed in Environmental Report Sections 3.3 and 3.11 are too few and are located at the site boundary or outside it; none are located within the site itself. They are not sufficient to use for demonstration of compliance with 10 CFR Part 20 Subpart E decommissioning criteria.

## **Management Measures (Chapter 11)**

### MM- 1 Section 11.1.4

Chapter 11.1.4, "Change Control," states that each change to the facility or activities of personnel will be evaluated in accordance with the requirements of 10 CFR 70.72. 10 CFR 70.72(c) allows the licensee to make changes without prior NRC approval if other conditions, primarily associated with the facility's safety program established in accordance with 10 CFR 70.62, "Safety Program and Integrated Safety Analysis," are met.

What criteria will be used to evaluate changes to the facility and activities of personnel which are not included in the safety program in order to determine whether prior NRC approval is required? How will this evaluation be documented and at what frequency will these changes be provided to the NRC after implementation?

MM- 2 Section 11.1.4.1

Chapter 11.1.4.1, "Design Phase," states that prior to issuance of the license, AES will notify the NRC of potential changes that reduce the level of commitments or margin of safety in the design bases of QA level 1 and 2 items and activities. Please clarify that AES will provide these changes to the NRC for review and approval prior to issuance of a license.

10 CFR 70.23(a)(3) and (4) require that the NRC determine that the applicant's proposed equipment and facilities and proposed procedures are adequate to protect health and minimize danger to life or property.

MM- 3 Section 11.1.4.3

Chapter 11.1.4.3, "Operations Phase," describes the evaluation of modifications in accordance with 10 CFR 70.72 and states that each modification shall be evaluated for any required changes or additions to the facility's procedures, personnel training, testing program, or regulatory documents. Clarify whether regulatory documents include the ISA, ISA summary, and other safety program information developed in accordance with 10 CFR 70.62.

10 CFR 70.72(a)(6) requires that the licensee evaluate the impacts of changes on the ISA, ISA summary, and other safety program information.

MM- 4 Section 11.2.4.4.2

Chapter 11.2.4.4.2, "Special Testing" states that special tests may be conducted at the discretion of the Plant Manager. Please clarify the SAR to describe the requirement to evaluate the impact of the special test in accordance with 10 CFR 70.72 prior to conducting it.

MM- 5 Section 11.4

Please describe the relationship of the first paragraph in Chapter 11.4, "Procedures Development and Implementation" to this section of the SAR. This paragraph describes requirements for independent verification as being consistent with the guidance of ANSI/ANS 3.2-1994 and appears to be out of place in the SAR.

MM- 6 Section 11.4

Please clarify the periodicity of procedure reviews in Chapter 11.4 "Procedures Development and Implementation" to assure their continued accuracy and usefulness. NUREG-1520 recommend that operating procedures be reviewed at least every 5 years

and emergency procedures be reviewed annually.

10 CFR 70.62(d) requires that management measures, which include certain procedures, shall ensure that IROFS are implemented and maintained such that they are available and reliable to perform their function when needed.

MM- 7 Section 11.4.3

Please revise Chapter 11.4.3 “Procedures” of the SAR to clarify that temporary changes to procedures are reviewed in accordance with 10.CFR 70.72 prior to implementation and that the temporary procedures will have an approved duration as required by 10.CFR 70.72(a)(5).

MM- 8 Section 11.5

Chapter 11.5, “Audits and Assessments” states that the audit and assessment program applies to quality assurance and that the Quality Assurance Department shall be responsible for audits. The SAR further states, on page 11.5-46 that personnel performing audits and assessments do not report to the production organization and have no direct responsibility for the function or area being assessed. Please clarify whether the personnel performing audits of quality assurance report to the Quality Assurance Department.

MM- 9 Section 11.5.4

Chapter 11.5.4, “Qualifications and Responsibilities for Audits and Assessments” describes the requirements for certification of lead auditors. Please describe the requirements for maintenance of proficiency and recertification.

10 CFR 70.62(d) requires that management measures, which include quality assurance elements such as audits and assessments, shall ensure that IROFS are designed, implemented and maintained such that they are available and reliable to perform their function when needed.

MM- 10 Section 11.17

Chapter 11.17 “Records” describes requirements for when a single records storage facility is used (i.e., the facility should be reviewed for adequacy by someone competent in fire protection and fire extinguishing). The QAPD, item 17.9 states that the requirements of ASME NQA-1-1994, Supplement 17S-1, Section 4.4 will be applied. Please clarify the SAR to make it consistent with the QAPD.

**Quality Assurance Program Description**

QA-1 Section 6.3

Item 6.3, Document Control, states that temporary procedure changes that do not change the intent of procedures can be made at the work location by responsible management. This is inconsistent with the statement in Chapter 11.4.3 of the SAR that

says that temporary changes to procedures must be approved by two members of management, at least one of whom is a Production Manager. Please clarify the QAPD to be consistent with the SAR. Additionally, clarify that procedure changes, including temporary changes, are subject to the requirements of 10 CFR 70.72.

QA-2 Section 7.4.6

Item 7.4.6, Control of Purchased Items and Services, states that acceptance of items includes one or more of the following methods: certificate of conformance, source verification, receiving inspection, post-installation test, and performance history. It further states that for QA level 1 IROFS, if performance history is used, at least one of the other acceptance methods must also be used. Please justify why performance history alone is an adequate method for acceptance of QA level 2 IROFS.

10 CFR 70.62(d) requires that management measures, which include other quality assurance elements such as procurement, shall ensure that IROFS are available and reliable to perform their function when needed.

QA-3 Section 7.6

Item 7.6, "Approved Suppliers List," describes the use of an approved suppliers list for vendors for which AES has determined have an acceptable QA program. Please clarify whether the approved suppliers list will state the scope of items and services for which the supplier is approved.

10 CFR 70.62(d) requires that management measures, which include other quality assurance elements such as procurement, shall ensure that IROFS are available and reliable to perform their function when needed.